REMARKS

Claims 1-12 are pending. By this Amendment, the specification and claim 3 are amended. Reconsideration based on the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

I. The Specification Satisfies All Formal Requirements

The Office Action objects to the specification because of informalities. The specification is amended to obviate the objection. Withdrawal of the objection to the specification is respectfully requested.

II. The Drawings Satisfy All Formal Requirements

The Office Action objects to the drawings because only that which is old is illustrated in Figs. 17 and 18. However, both Figs. 17 and 18 illustrate modifications of the present invention and other parts of the modifications follow the disclosure of the present invention. Withdrawal of the objection to the drawings is respectfully requested.

III. The Claim 3 Satisfies All Formal Requirements

The Office Action objects to claim 3 because of informalities. Claim 3 is amended to correctly depend from claim 2 to obviate the objection, thereby clearly reciting that the "inclination adjustment means" of claim 1 is different from the "swivel adjustment means" of claim 2. As clearly recited in the claims, the swivel adjustment means rotates a workpiece within the X-Y plane, while the inclination adjustment means displaces the workpiece within the X-Z plane. Withdrawal of the objections is respectfully requested.

IV. The Claims Define Allowable Subject Matter

The Office Action rejects claims 4 and 7-12 under 35 U.S.C. §102(b) as unpatentable over PCT Publication WO 90/12277 to Bielle et al. (hereinafter "Bielle"); claims 4 and 6

under 35 U.S.C. §102(b) as unpatentable over U.S. Patent No. 5,408,750 to Teng et al. (hereinafter "Teng"); and claim 1 under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,154,713 to Peter et al. (hereinafter "Peter"). The rejections are respectfully traversed.

A feature of the present invention is a calculation of an inclination angle within the X-Y plane (swivel inclination angle) by the X-axis and Y-axis coordinates at a measurement start point and a measurement end point, and provisions of a means for manually displacing a workpiece in the Y-axis direction and rotating the workpiece within the X-Y plane in accordance with the swivel correction angle calculated by the swivel inclination angle are not disclosed in the references cited by the Examiner.

Instead, Bielle discloses a mechanism for adjusting the Z-axis coordinates of a circular table 140 by three adjustable support points 130 in order to minimize the Z-axis vibration in measuring a contour of a plane member to shorten measurement time. The table 140 can be rotated about the axis of a spherical collimation plate 15. Displacement of the table 140 in the X-axis and Y-axis directions is restricted by the plate 15. Accordingly, Bielle does not disclose a feature of calculating the swivel inclination angle and the swivel correction angle, and rotating a workpiece within the X-Y plane in accordance with the swivel correction angle.

Further, Bielle does not disclose calculating an operation amount at a point of action by calculating a center locus of measurement data, as recited in claim 8. Instead, Bielle obtains data for collimating the workpiece by processing different measurements based on each Z axis coordinate of three adjustable support points 130.

Teng does not disclose an orientation adjustment method for rotating a workpiece within an X-Y plane, as recited in claim 4. Instead, Teng discloses a X-Y table that has no function for rotating a workpiece within the X-Y plane. Teng surely has a rotation direction adjusting device of a block 100 as described from col. 9, line 35- col. 10, line 44. Since Teng

uses a two-dimensional X-Y encoder and it is necessary for Teng that the displacement direction of mounting member 18 (X, Y directions) and X-Y detecting direction of the X-Y encoder are accurately coincided with each other, Teng has an adjustment means for correcting angular deviation (see Fig. 10) shown in Figs. 11A and 11B. However, this adjustment means is used only for coinciding the displacement directions of the block 100 fitted to the support 18 (i.e. displacement direction of the mounting member 18) with the X-Y detecting direction, not for correcting attitude of the workpiece.

The Office Action admits that Peter does not disclose the use of a manual displacement and adjustment means.

However, the Office Action asserts that these deficiencies are made up by obviousness to one having ordinary skill in the art. This assertion is respectfully traversed.

Peter does not disclose calculation of the attitude of the workpiece within the X-Y plane (swivel inclination angle) based on coordinate values of measurement start point and measurement end point and manual rotation of the workpiece within the X-Y plane, as recited in claim 1. Instead, Peter controls rotation of a workpiece and a probe by providing a probe measuring the workpiece, using the result of measurement to calculate pass data by interpolation, calculating a normal line base on the pass data and directing the probe in the normal line direction.

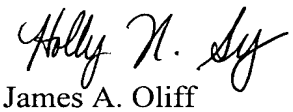
For at least these reasons, it is respectfully submitted that claims 1, 4 and 8 are distinguishable over the applied art. Claims 2-3, 5-7 and 9-12, which depend from claims 1, 4 and 8, respectively, are likewise distinguishable over the applied art for at least the reasons discussed as well as for the additional features they recite. Withdrawal of the rejections under 35 U.S.C. §102(b) and 35 U.S.C. §103(a) is respectfully requested.

V. Conclusion

For at least the reasons discussed above, it is respectfully submitted that this application is in condition for allowance.

Should the Examiner believe that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Holly N. Sy
Registration No. P-50,212

JAO:HNS/cfr

Attachment:
Appendix

Date: March 12, 2002

OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE AUTHORIZATION
Please grant any extension necessary for entry;
Charge any fee due to our Deposit Account No. 15-0461

OIPE JC10 MAR 12 2002 PATENT & TRADEMARK OFFICE

APPENDIX

Changes to Specification:

Page 10, lines 18-29:

A workpiece orientation adjustment stage 10 is provided on the base 11, the workpiece orientation adjustment stage 10 having a Y-axis stage 12 capable of moving in Y-axis direction (a direction orthogonal with X-axis direction [measurement direction] on a horizontal plane), a R-axis stage 13 provided on the Y-axis stage 12 and being capable of seesawing in R-axis direction (a direction orthogonal with the X-axis direction on a perpendicular plane), and a rotary stage 14 provided on the R-axis stage 13 and being rotatable in θé direction. Further, a column 15 stands on a right side of the rear of the base 11 as illustrated, the column 15 having a Z-axis slider 16 vertically movable along Z-axis direction. A measuring mechanism 20 is provided to the Z-axis slider 16 movably in X-axis direction (measurement direction).

Page 12, lines 15-18:

As shown in Fig. 2, the surface texture measuring machine 1 has the measuring machine body 1A and a measurement controller ~~51~~ 50 for controlling the measuring machine body 1A for adjusting orientation of the workpiece 17.

Page 13, lines 30-33:

In step 180, swivel inclination angle δä is calculated based on the coordinates values (Xs, Ys) and (Xe, Ye) obtained in steps 140 and 170 according to a formula of: tan δä = (Ye - YS) / (Xe - Xs), and swivel correction angle ds is further obtained.

Page 13, line 35- page 14, line 3:

As shown in Fig. 3, when the distance between the rotation fulcrum A of the swivel and manipulation point B (a position where the swivel is pushed and pulled) of the swivel

Digimatic micrometer head 42 is L and inclination angle of the swivel is δä, since tanδä = (ds / L), the operation amount ds of the swivel Digimatic micrometer head can be represented as:

ds = Ltanδä.

Page 18, lines 23-28:

Specifically, as shown in Fig. 12, when the initial inclination angle of the stage 71, i.e. the inclination line C is parallel to the base line N and the angle of the center locus M relative to the base line N is θ1é1, accurate operation amountΔh Äh can be obtained according to formula of ΔhÄh = r*sinθ1é1. Here, r represents a distance from the fulcrum A of the stage 71 to the point of action B.

Page 18, lines 29-35:

On the other hand, when the inclination line C of the stage 71 is not parallel to the base line N but is rising in the right direction relative to the base line N, turn angle thereof can be represented as θ2é2 as shown in Fig. 12. When the stage is manipulated for ΔhÄh from a position remote from the base line N, the stage is manipulated at a steeper position for an angle away from the base line N as compared to manipulation for ΔhÄh from a horizontal position, so that θ2é2 becomes smaller than θ1é1 (θ1é1 > θ2é2).

Page 19, line 28- page 20, line 2:

Fig. 13(A) shows a measurement of inclination of a measurement surface of the workpiece, where the initial inclination of the inclination line C declines rightward by an absolute quantity ht relative to the inclination adjustment reference position P. Since the inclination angle of the inclination line C relative to the base line N including the inclination adjustment reference position P is θtét and the inclination angle of the measurement surface of the workpiece relative to the base line N including the inclination adjustment reference position P is θwéw, it is necessary to turn the stage 71 by θwéw relatively. However, as

mentioned above, since the error can be caused, the relative minute displacement at the point of action B for turning only by θwéw relative to the base line N cannot be uniformly decided.

Page 20, lines 3-6:

In this case, as shown in Fig. 13(B), the inclination of the measurement surface of the workpiece (center locus) can be coincided with the base line without error by setting the manipulated valuable hc equal to an absolute value from P where the turning angle is θcée (=θtét + θwéw).

Changes to Claims:

The following is a marked-up version of the amended claim:

3. (Amended) The surface texture measuring machine according to ~~Claims 1~~Claim 2, wherein the Y-axis adjustment means, the swivel adjustment means and the inclination adjustment means respectively include a micrometer head.